INEEL/EXT-02-00358 (FY 2002 QTR 4)

January 2003

Nuclear Materials Events Database (NMED) Quarterly Report

Fourth Quarter Fiscal Year 2002

Samuel L. Pettijohn, NRC

Stephen B. Conroy, INEEL

Attachment 6

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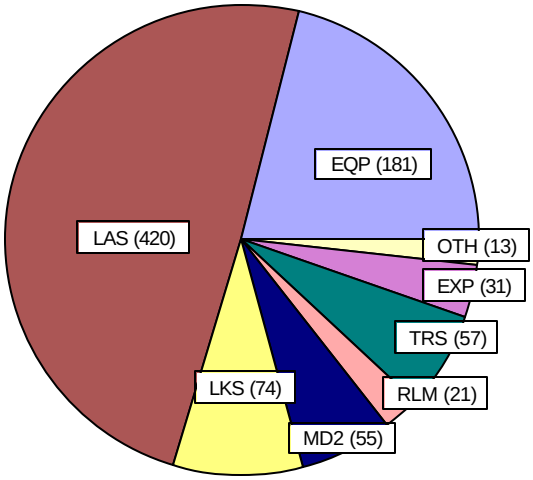
ABSTRACT

This quarterly report presents information on trending and analysis of incidents/accidents (events) reported to the Nuclear Regulatory Commission (NRC) that involve radioactive materials. The events are reported by NRC licensees, Agreement States, and non-licensees, and are recorded in the NRC's Nuclear Materials Events Database (NMED). The reported events are classified into nine categories and "Other." The categories are based on event reporting requirements defined in Title 10 of the Code of Federal Regulations. The categories are (1) Medical Events, (2) Radiation Overexposures, (3) Release of Licensed Material or Contamination, (4) Loss of Control of Material, (5) Leaking Sealed Sources, (6) Equipment Problems, (7) Transportation, (8) Fuel Cycle Facility Events, and (9) Non-Power Reactor Events. The scope of the NMED quarterly report is limited to a discussion and evaluation of categories (1) through (7) and "Other." Events involving fuel cycle facilities and non-power reactors are excluded from this report due to the significant difference in operation of these facilities compared to the operation of other facilities licensed by NRC and Agreement States to use by-product, source, and special nuclear material. Data on trending and analysis of reported events are presented by cause, reporting requirements, event type, and corrective actions for each of the categories. Data on these events are presented for an 18-month period (trending) covering April 1, 2001 through September 30, 2002. Data on reportable events tracked by the NRC as performance measures under the FY 2000 - 2005 Strategic Plan are presented on page *ix*.

Copies of this report are available on the Internet at http://nmed.inel.gov.

EXECUTIVE SUMMARY

The Nuclear Regulatory Commission's Nuclear Materials Events Database contains records of events involving nuclear materials reported to the NRC by NRC licensees, Agreement States, and non-licensees. The reported events are classified based on event reporting requirements defined by Title 10 of the Code of Federal Regulations. The event reports are evaluated to identify any safety-significant events and concerns, and their causes. The reported information aids understanding of why the events occurred and in identifying any actions necessary to improve the effectiveness of the nuclear material regulatory program. Events involving fuel cycle facilities and non-power reactor events are excluded from this report due to the significant difference in operation of these facilities compared to the operation of other facilities licensed by the NRC and Agreement States to use by-product, source, and special nuclear material.



EQP - Equipment Problems
EXP - Radiation Overexposures
LAS - Loss of Control of Material
LKS - Leaking Sealed Sources
MD2 - Medical Events
OTH - Other
RLM - Release of Licensed Material or Contamination
TRS - Transportation

Eight hundred fifty-two events were reported during the 18-month period. One hundred twenty-eight of these events were reported during the current quarter.

- Forty-nine percent of the reported events were classified as Loss of Control of Material.
- The remaining 51% of events were divided between Equipment Problems (21%), Leaking Sealed Sources (9%), Transportation (7%), Medical Events (6%), Radiation Overexposures (4%), Release of Licensed Material or Contamination (2%), and Other (2%).

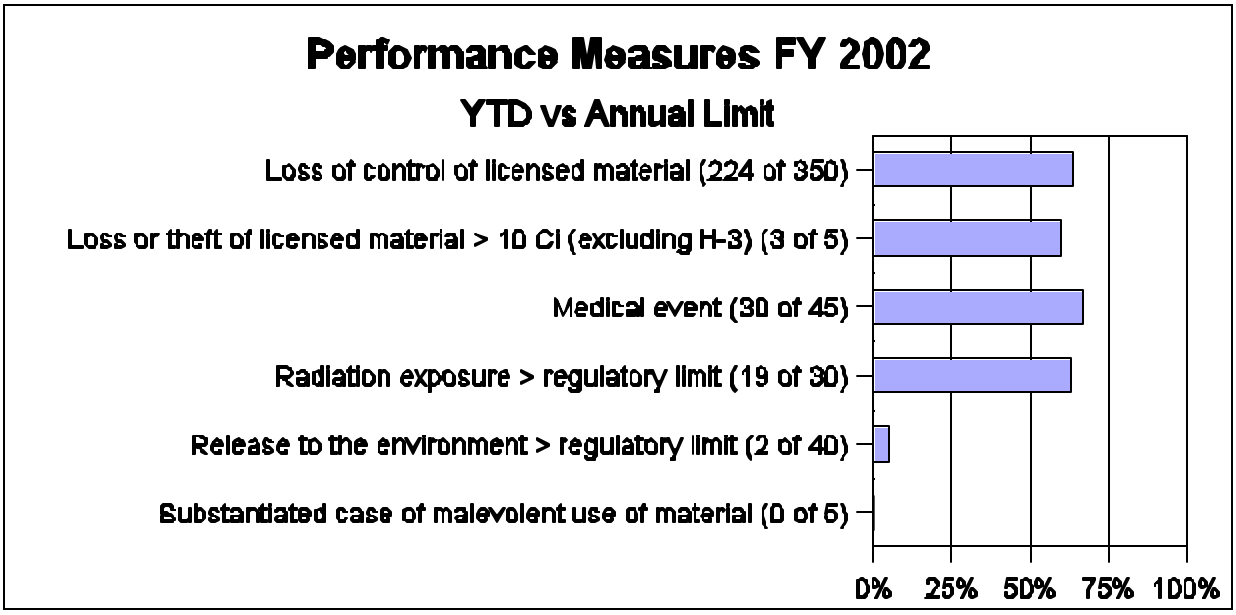
The event reporting rate is about 2.7 events per 100 licensees annually for all events, and about 0.7 events per 100 licensees annually for Medical Events. This is based on an estimate of about 21,000 material licensees (about 6,000 NRC licensees and 15,000 Agreement State licensees) that reported 568 events (annual rate) and about 5,000 medical licensees that reported 37 Medical Events (annual rate). This indicates that, annually, only 2.7% of all licensees report any type of incident/accident involving

licensed material. For incidents involving Medical Events, less than 1% of medical licensees report an event annually.

PERFORMANCE MEASURES

All NMED reportable events for Radiation Overexposures, Medical Events, Loss of Material, Malevolent Acts (intentional violation), and Release of Material (reporting requirement 10 CFR 20.2203(a)(3)(ii) only) are tracked by the NRC as performance measures under the NRC FY 2000 - 2005 Strategic Plan. The NRC Strategic Plan is available on the NRC's website at www.nrc.gov.

The following charts show Fiscal Year 2002 performance measures as a percentage of the annual limits. Data for the performance measure charts represent data at the close of Fiscal Year 2002 (i.e., data through September 30, 2002). Slight variations between these data and data presented in the body of the report (downloaded on January 9, 2002) may exist.



Nuclear Materials Events Database (NMED) Quarterly Report: Fourth Quarter Fiscal Year 2002

1. INTRODUCTION

1.1 Overview and Objectives

Nuclear materials event reports are evaluated to identify any safety-significant events and concerns, their causes, and corrective actions. The reported information aids understanding of why the events occurred and in identifying any actions necessary to improve the effectiveness of the nuclear material regulatory program.

A database for tracking nuclear materials events was developed by the Nuclear Regulatory Commission (NRC) in 1981. In 1993, using existing materials events databases, the NRC developed a new and more comprehensive database for tracking materials events. This database, designated the Nuclear Materials Events Database (NMED), contains records of events involving nuclear materials reported to the NRC by NRC licensees, Agreement States, and non-licensees. The database is maintained by the Idaho National Engineering and Environmental Laboratory (INEEL) and contains almost 14,000 records of materials events submitted to the NRC from approximately January 1990 through September 2002.

The reported events are classified into nine primary categories and "Other," based on event reporting requirements defined by Title 10 of the Code of Federal Regulations (CFR). The categories are (1) Medical Events, (2) Radiation Overexposures, (3) Release of Licensed Material or Contamination, (4) Loss of Control of Material, (5) Leaking Sealed Sources, (6) Equipment Problems, (7) Transportation, (8) Fuel Cycle Facility Events, and (9) Non-Power Reactor Events. The scope of the NMED quarterly report is limited to a discussion and evaluation of categories (1) through (7) and "Other." Events involving fuel cycle facilities and non-power reactors are excluded from this report due to the significant difference in operation of these facilities compared to the operation of other facilities licensed by NRC and Agreement States to use by-product, source, and special nuclear material. A description of categories addressed in this report and associated screening criteria is contained in Appendix A.

1.2 NMED Database

The NMED accommodates multiple events in a single report to be recorded and tracked. For example, a report may describe a loss of control of licensed material that also resulted in an overexposure. In such a case, both events are recorded in the NMED and identified by the same report number. The NMED Quarterly Report, which provides a summary of event data contained within the NMED, has been designed to further enhance the usefulness of the database. Data presented in this report were downloaded from the NMED on January 9, 2002. Be aware that the NMED is a dynamic database and updated daily. Therefore, slight variations in quarterly data may be encountered. Also note that, even though many events were reported and entered in the database for record keeping, only those events required to be reported under 10 CFR are addressed in this report.

In summary, this report focuses on reportable

events that occurred between April 1, 2001 and September 30, 2002 that were entered into NMED prior to the data download on January 9, 2002. More specifically, this report includes a depiction of selected NMED 18-month trend data, and a breakdown of event causes, reporting categories, and event type data.

Performance measures data are presented on page *ix*. Appendix A presents a detailed description of the NMED data categories discussed in this report.

Reporting guidance for Agreement States is presented in the *Handbook on Nuclear Material Event Reporting in the Agreement States*. The handbook is an appendix to the NRC Office of State Programs Procedure SA-300, *Reporting Material Events*. Access to NMED is available to the NRC and Agreement State staff at http://nmed.inel.gov.

For assistance on searches or to answer other questions, contact Sam Pettijohn (slp@nrc.gov), (301) 415-6822.

2. ANALYSIS OF NMED DATA

Event reports involving nuclear materials submitted to the NRC are reviewed, categorized, and entered into the NMED. Eighteen-month trend charts with quarterly data points were developed to show general data trends. For this report, Fiscal Quarter 02-4 and 18-month event data were evaluated.

Several event reports did not contain sufficient information to determine the event causes. Such events were categorized as "Insufficient Information" concerning the event causes.

2.1 All NMED Events

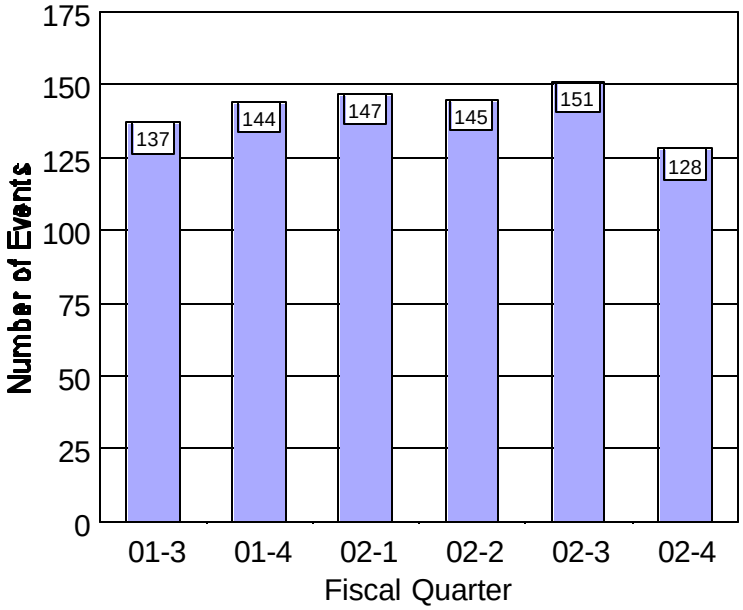


Figure 1. All NMED Events (18-months)

Figure 1 displays the number of NMED events that occurred per fiscal quarter during the 18-month period. The following observations were made concerning NMED events reported in the 18-month period:

- Eight hundred fifty-two reportable events occurred in the 18-month period.
- Events averaged 142 per quarter, with 128 events occurring in Fiscal Quarter 02-4.

2.2 Medical Events (MD2)

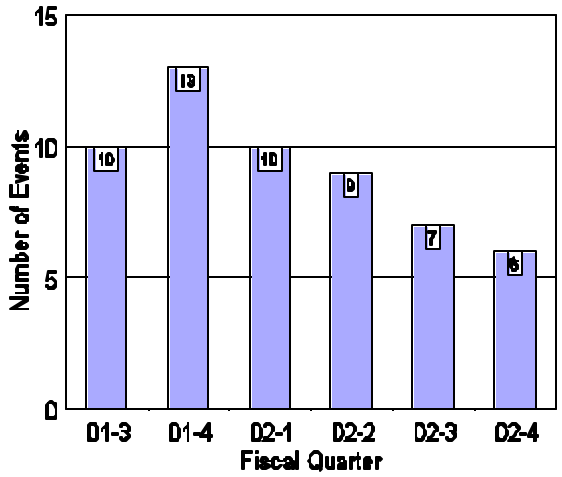


Figure 2. MD2 Events (18-months)

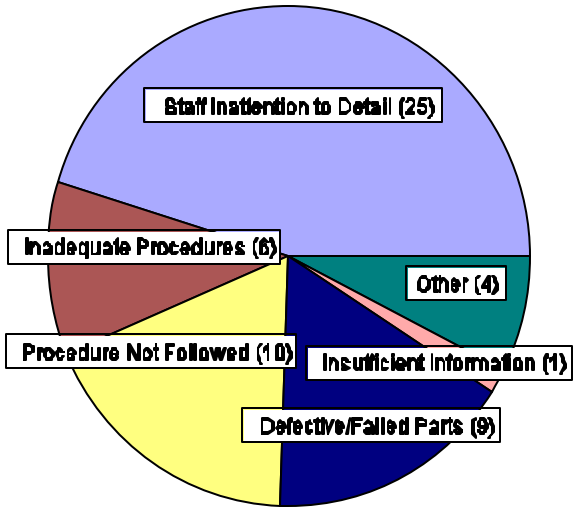


Figure 3. MD2 Event Causes (18-months)

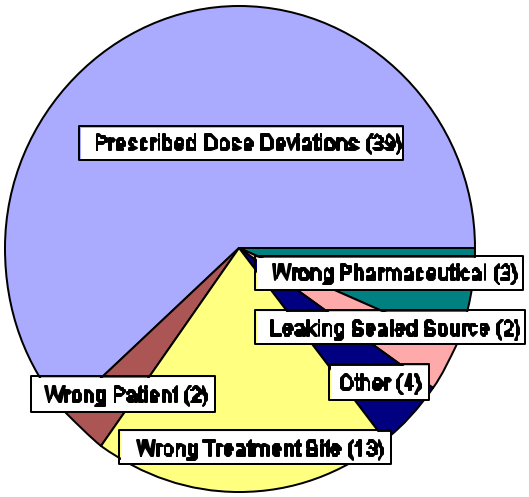


Figure 4. MD2 Event Reporting Requirements (18-months)

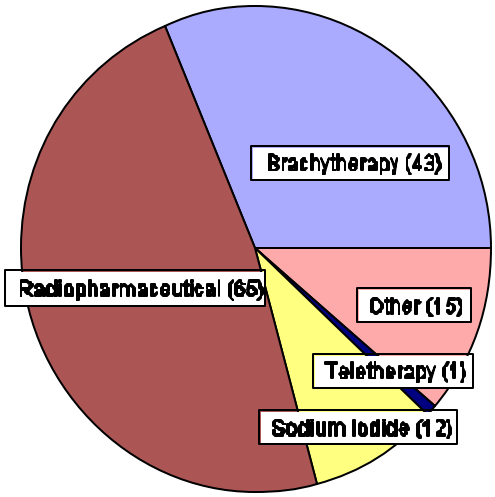


Figure 5. MD2 Event Therapeutic and Diagnostic Procedures (18-months)

Figures 2 through 5 display the number per quarter and breakdown of reportable MD2 events occurring for the 18-month period. The following observations were noted:

- Fifty-five MD2 events occurred in the 18-month period.

1.06 Events averaged nine per quarter, with six events in Fiscal Quarter 02-4.

1.07 Staff inattention to detail and procedure non-compliance were the causes of over half the events.

1.08 Most MD2 events involved prescribed dose deviations or wrong treatment sites (an event can be associated with more than one reporting requirement).

1.09 Almost 80% of the incidents involved radiopharmaceuticals and brachytherapy treatments (one radiopharmaceutical event involved 61 patients). (An event can involve more than one type of

procedure.)

2.3 Radiation Overexposures (EXP)

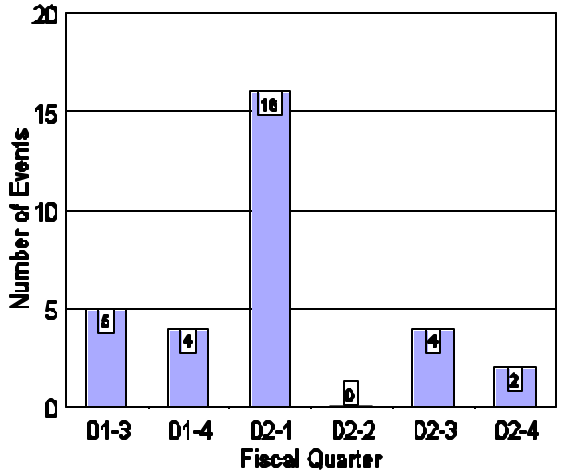


Figure 6. EXP Events (18-months)

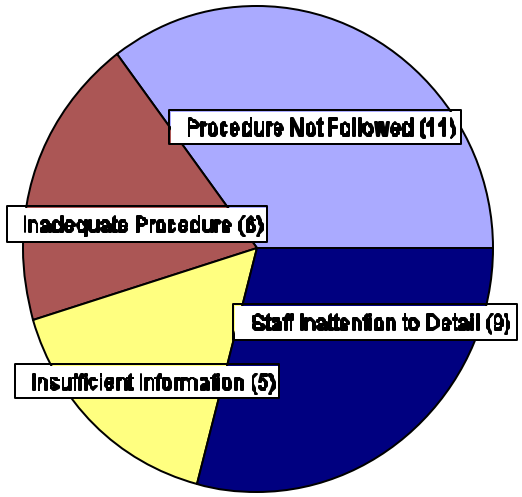


Figure 7. EXP Event Causes (18-months)

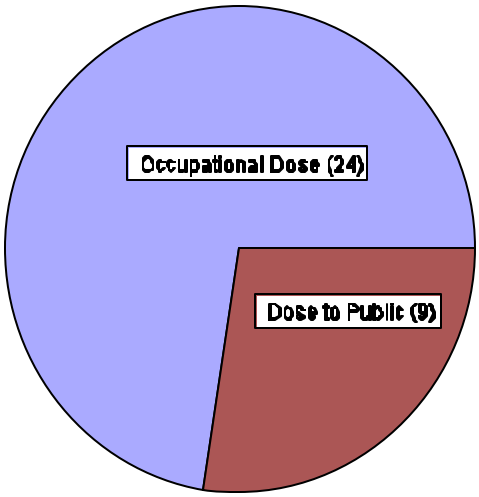


Figure 8. EXP Event Reporting Requirements (18-months)

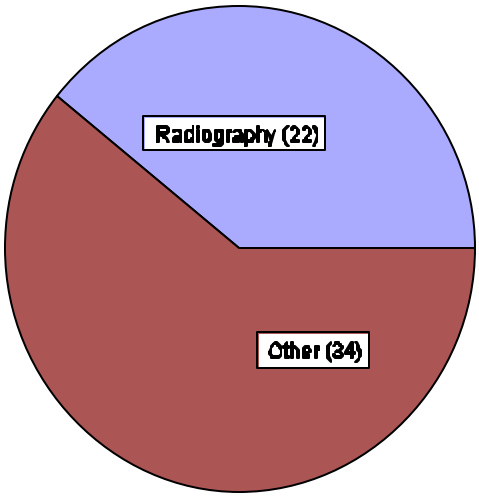


Figure 9. EXP Event Exposures (18-months)

Figures 6 through 9 display the number per quarter and breakdown of reportable EXP events occurring for the 18-month period. The following observations were noted:

- Thirty-one EXP events occurred in the 18-month period.

1.11 Events averaged five per quarter, with two events in Fiscal Quarter 02-4.

1.12 Procedure non-compliance and staff inattention to detail caused most of the events.

1.13 The majority of the EXP events involved exceeding occupational dose limits (an event can involve more than one type of reporting requirement).

1.14 Over half of the events involved radiography (an event can involve more than one type of exposure). A single “Other” event in Fiscal Quarter 02-3 involved the 31 individual exposures from a well logging source.

2.4 Release of Licensed Material or Contamination (RLM)

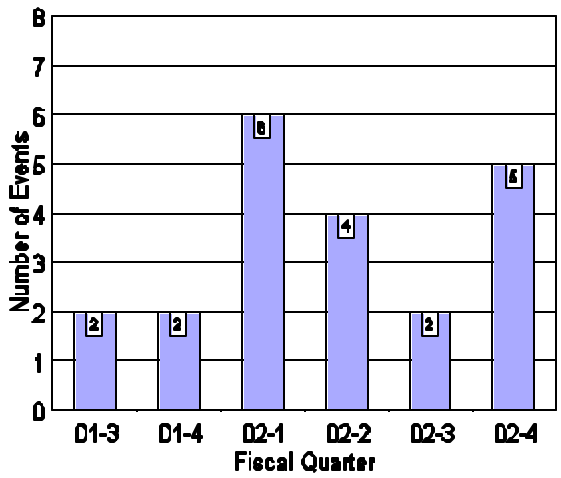


Figure 10. RLM Events (18-months)

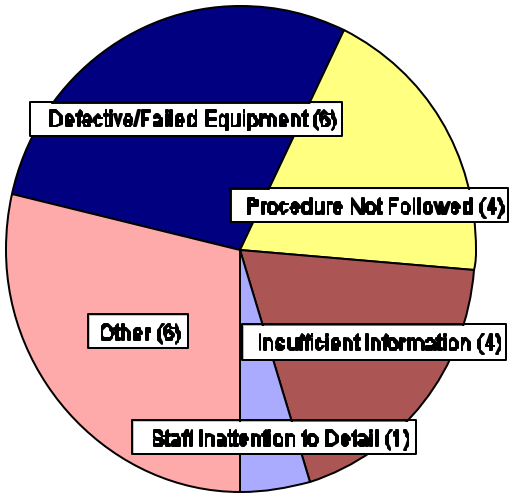


Figure 11. RLM Event Causes (18-months)

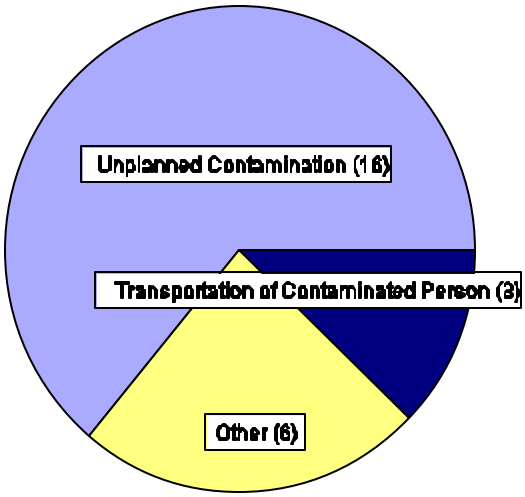


Figure 12. RLM Event Reporting Requirements (18-months)

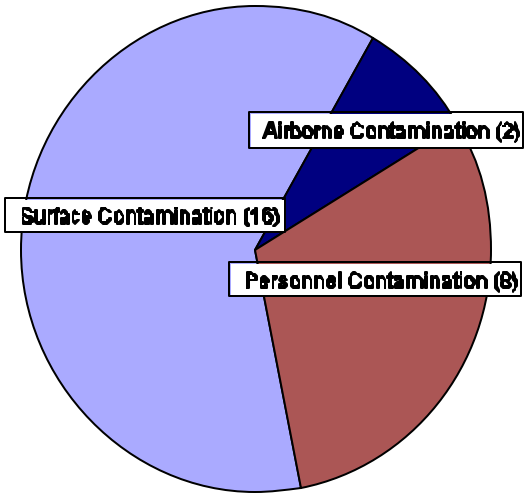


Figure 13. RLM Event Releases (18-months)

Figures 10 through 13 display the number per quarter and breakdown of reportable RLM events occurring for the 18-month period. The following observations were noted:

- Twenty-one RLM events occurred in the 18-month period.

1.16 Events averaged four per quarter, with five events in Fiscal Quarter 02-4.

1.17 Defective/failed equipment was the largest single causal category.

1.18 The majority of the EXP events involved unplanned contamination (an event can be associated with more than one reporting requirement).

1.19 Three-quarters of the events involved surface contamination (an event can involve more than one type of contamination).

2.5 Loss of Control of Material (LAS)

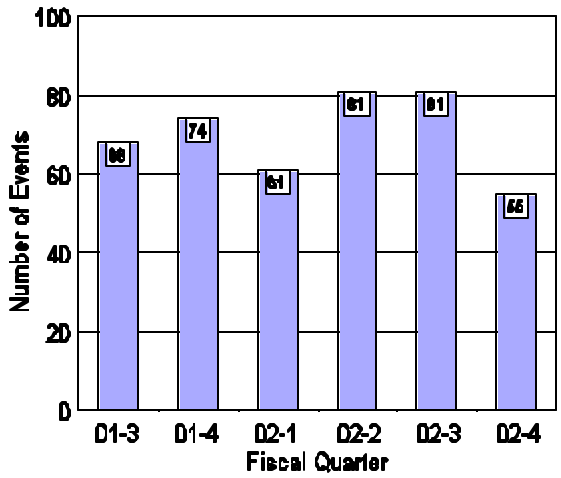


Figure 14. LAS Events (18-months)

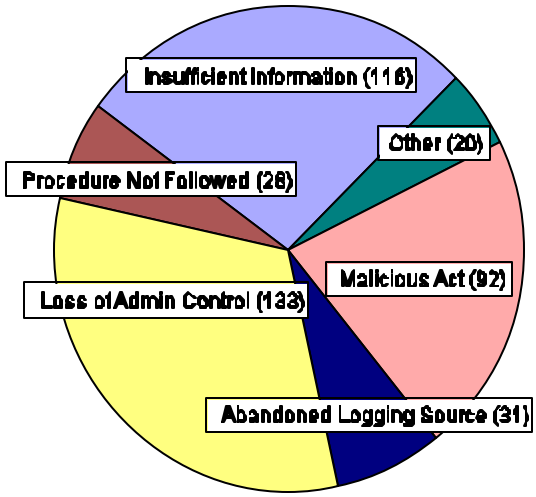


Figure 15. LAS Event Causes (18-months)

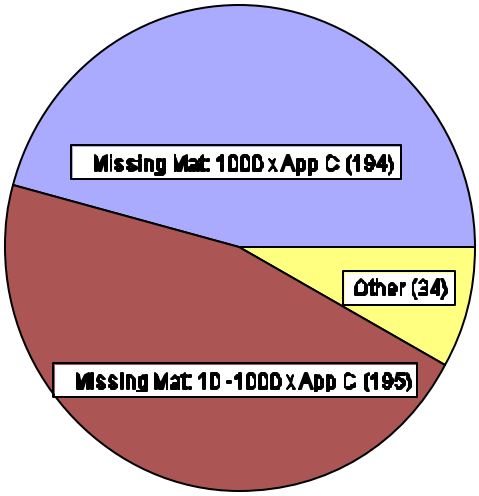


Figure 16. LAS Event Reporting Requirements (18-months)

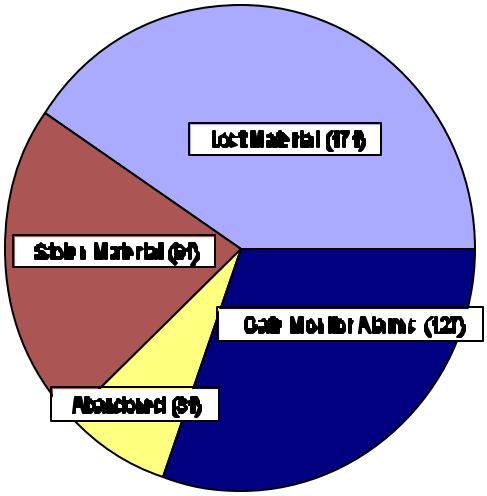


Figure 17. LAS Event Losses (18-months)

Figures 14 through 17 display the number per quarter and breakdown of reportable LAS events occurring for the 18-month period. The following observations were noted:

- Four hundred twenty LAS events occurred in the 18-month period.

1.21 Events averaged 70 per quarter, with 55 events in Fiscal Quarter 02-4.

1.22 Loss of administrative control, insufficient information reported, and malicious act were the largest causal categories.

1.23 The majority of the LAS events involved lost or stolen material (an event can be associated with more than one reporting requirement).

1.24 Almost half of the events involved lost material, followed by alarming gate monitors and stolen material.

2.6 Leaking Sealed Sources (LKS)

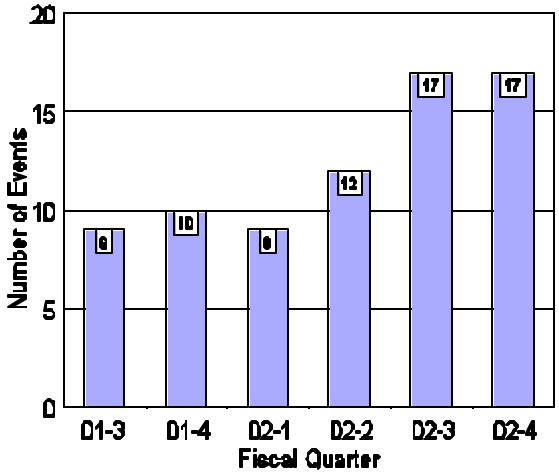


Figure 18. LKS Events (18-months)

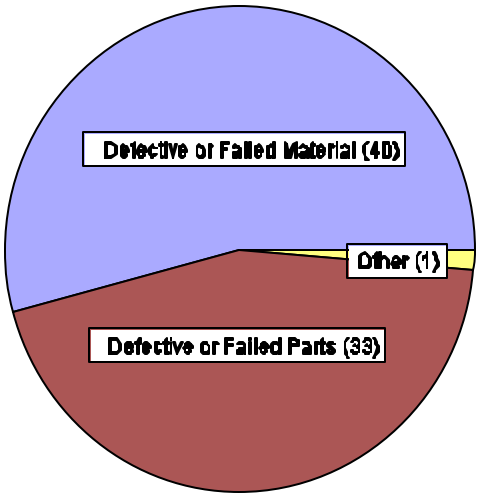


Figure 19. LKS Event Causes (18-months)

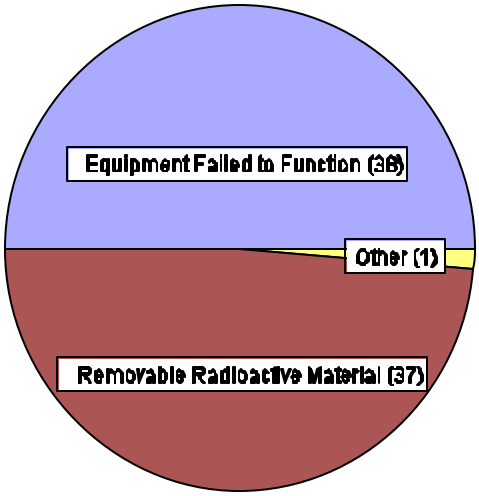


Figure 20. LKS Event Reporting Requirements (18-months)

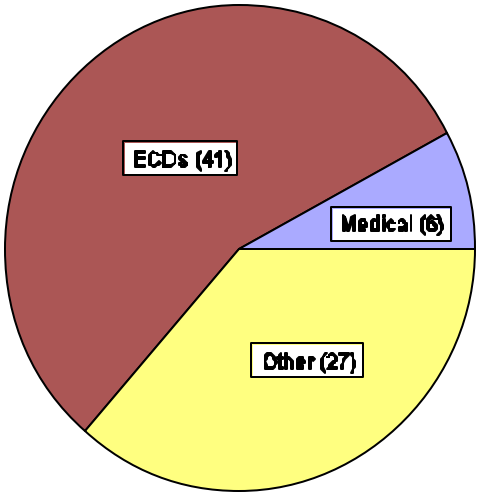


Figure 21. LKS Event Sealed Sources (18-months)

Figures 18 through 21 display the number per quarter and breakdown of reportable LKS events occurring for the 18-month period. The following observations were noted:

- Seventy-four LKS events occurred in the 18-month period.

1.26 Events averaged 12 per quarter, with 17 events in Fiscal Quarter 02-4.

1.27 Defective or failed material and parts were the largest causal categories.

1.28 All but one of the LKS events involved either failed equipment or removable radioactive material (an event can be associated with more than one reporting requirement).

1.29 Over half of the events involved ECDs.

2.7 Equipment Problems (EQP)

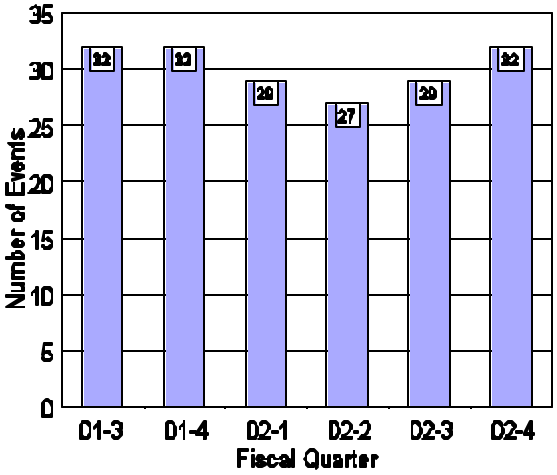


Figure 22. EQP Events (18-months)

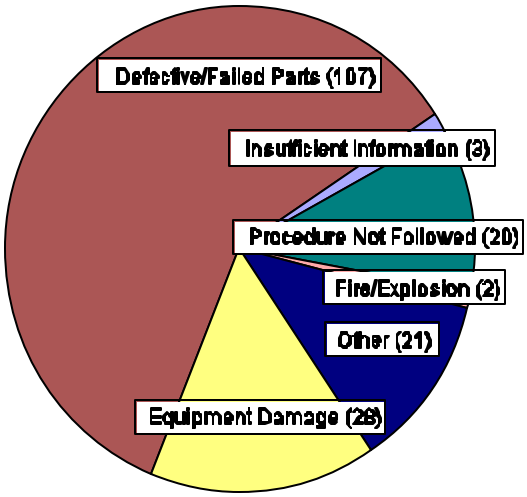


Figure 23. EQP Event Causes (18-months)

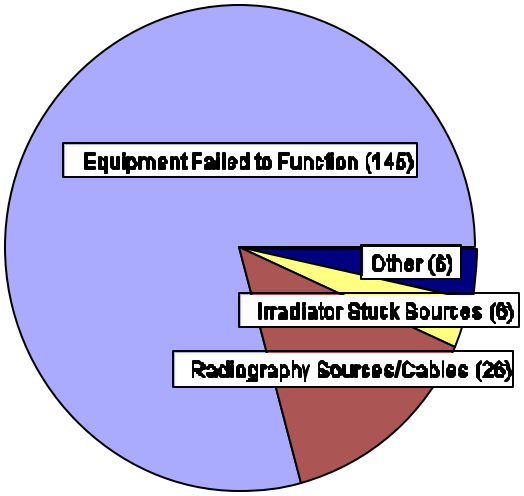


Figure 24. EQP Event Reporting Requirements (18-months)

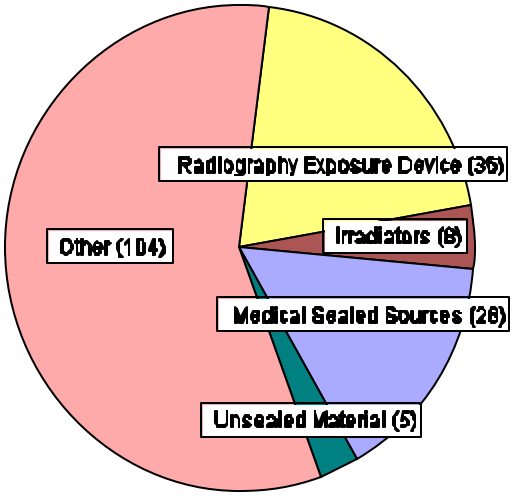


Figure 25. EQP Equipment (18-months)

Figures 22 through 25 display the number per quarter and breakdown of reportable EQP events occurring for the 18-month period. The following observations were noted:

- One hundred eighty-one EQP events occurred in the 18-month period.

1.31 Events averaged 30 per quarter, with 32 events in Fiscal Quarter 02-4.

1.32 Defective or failed parts was the largest causal category.

1.33 Over three quarters of the EQP events involved equipment failing to function (an event can be associated with more than one reporting requirement).

1.34 Over half of the events involved “Other” event types, while the remainder was split primarily between medical sealed sources and radiography exposure devices.

2.8 Transportation (TRS)

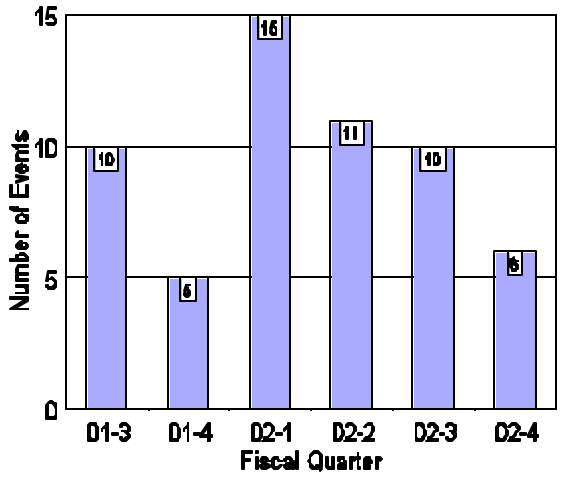


Figure 26. TRS Events (18-months)

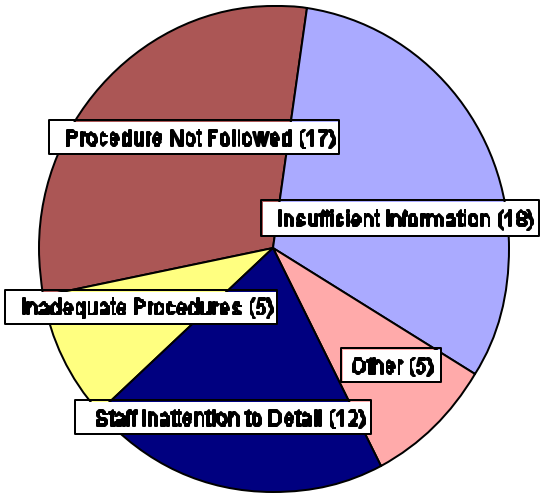


Figure 27. TRS Event Causes (18-months)

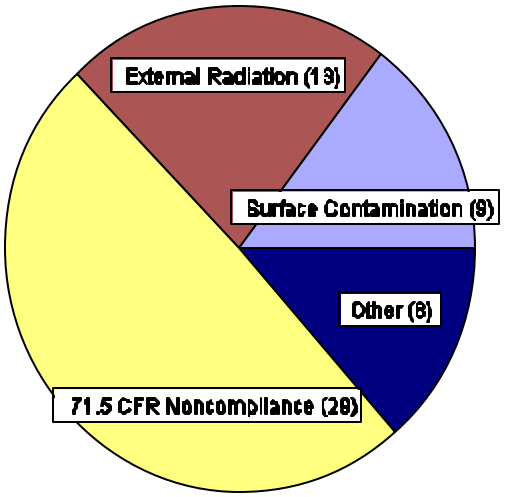


Figure 28. TRS Event Reporting Requirements (18-months)

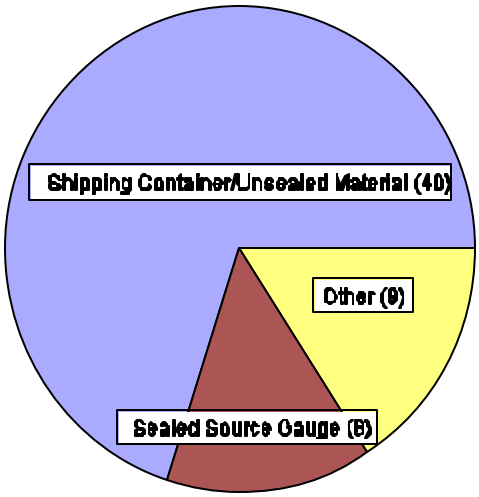


Figure 29. TRS Event Materials (18-months)

Figures 26 through 29 display the number per quarter and breakdown of reportable EQP events occurring for the 18-month period. The following observations were noted:

- Fifty-seven TRS events occurred in the 18-month period.

1.36 Events averaged 10 per quarter, with six events in Fiscal Quarter 02-4.

1.37 Procedure non-compliance and staff inattention to detail were the largest specified causal categories.

1.38 Over half of the events involved 10 CFR 71.5 non-compliance (an event can be associated with more than one reporting requirement).

1.39 Most of the events involved shipping containers or unsealed material during transportation.

2.9 Other (OTH)

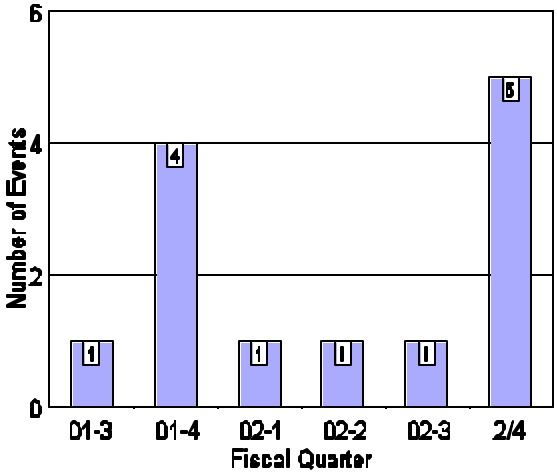


Figure 30. OTH Events (18-months)

Figure 30 display the number per quarter and breakdown of reportable OTH events occurring for the 18-month period. The following observations were noted:

- Thirteen OTH events occurred in the 18-month period.

1.41 Events averaged two per quarter, with five events in Fiscal Quarter 02-4.

Appendix A

Event Type Descriptions and Criteria

Appendix A

Event Type Descriptions and Criteria

The NMED events covered by this report are divided into the following categories based on the event reporting requirements defined in 10 CFR.

Medical Events (MD2)

Medical events (formerly referred to as medical misadministrations) are defined in 10 CFR Part 35 as follows:

1. A radiopharmaceutical dosage greater than 30 microcuries of either sodium iodide I - 125 or I - 131:
   - Involving the wrong individual, or wrong radiopharmaceutical; or
   - When both the administered dosage differs from the prescribed dosage by more than 20 percent of the prescribed dosage and the difference between the administered dosage and prescribed dosage exceeds 30 microcuries.

2. A therapeutic radiopharmaceutical dosage, other than sodium iodide I - 125 or I - 131:
   - Involving the wrong individual, wrong radiopharmaceutical, or wrong route of administration; or
   - When the administered dosage differs from the prescribed dosage by more than 20 percent of the prescribed dosage.

3. A gamma stereotactic radiosurgery radiation dose:
   - Involving the wrong individual, or wrong treatment site; or
   - When the calculated total administered dose differs from the total prescribed dose by more than 10 percent of the total prescribed dose.

4. A teletherapy radiation dose:
   - Involving the wrong individual, wrong mode of treatment, or wrong treatment site;
   - When the treatment consists of three or fewer fractions and the calculated total administered dose differs from the total prescribed dose by more than 10 percent of the total prescribed dose;
   - When the calculated weekly administered dose exceeds the weekly prescribed dose by 30 percent or more of the weekly prescribed dose; or
   - When the calculated total administered dose differs from the total prescribed dose by more than 20 percent of the total prescribed dose.

5. A brachytherapy radiation dose:
   - Involving the wrong individual, wrong radioisotope, or wrong treatment site (excluding, for permanent implants, seeds that were implanted in the correct site but migrated outside the treatment site);
   - Involving a sealed source that is leaking;
   - When, for a temporary implant, one or more sealed sources are not removed upon completion of the procedure; or
   - When the calculated administered dose differs from the prescribed dose by more than 20 percent of the prescribed dose.

6. A diagnostic radiopharmaceutical dosage, other than quantities greater than 30 microcuries of either

sodium iodide I - 125 or I - 131, both:
- Involving the wrong individual, wrong radiopharmaceutical, wrong route of administration, or when the administered dosage differs from the prescribed dosage; and
- When the dose to the individual exceeds 5 rems effective dose equivalent or 50 rems dose equivalent to any individual organ.

Events are not considered MD2 events if they involve:

1. Only accelerator produced radiopharmaceuticals.
2. Only a linear accelerator.
3. A dose calculation error made by the prescribing physician that was administered as (incorrectly) prescribed.
4. Patient intervention.

Events are considered MD2 events if they involve:

1. A radiopharmaceutical containing by-product material was prescribed, but a radiopharmaceutical containing accelerator produced material was administered.
2. A radiopharmaceutical containing accelerator produced material was prescribed, but a radiopharmaceutical containing by-product material was administered.
3. A linear accelerator is used for therapy by mistake instead of a teletherapy unit or a teletherapy unit instead of a linear accelerator.

MD2 events occur to patients only. Hospital patients are always considered to be patients, rather than members of the general public, for purposes of determining whether to categorize an event as an MD2 or EXP event. For example, if a patient was administered a radiopharmaceutical that was prescribed for another patient, the event would be categorized as an MD2 event (radiopharmaceutical given to the wrong patient) rather than an EXP event.

Radiation Overexposures (EXP)

The EXP event category includes all regulatory overexposures of radiation workers or exposures of members of the public to radiation. The overexposure can be external or internal and can be whole body, extremity, skin, lens of the eye, or internal dose. When the overexposure involves multiple individuals or an individual with multiple overexposure types (such as whole body and extremity), the different types of overexposures are classified into the NMED Event Table separately. Note that dosimeters record exposure if improperly stored near a radiation source and, depending on the type of dosimeter, may react as though they are in a radiation field when exposed to heat or humidity. It is NRC policy to classify only those events that positively involve a personnel overexposure, and not just a dosimeter exposure, as reportable EXP events. For example, either the licensee does not contest the personnel overexposure, or in cases where the licensee does contest the overexposure, the State or NRC determines the event to be personnel overexposure. EXP events are categorized as follows:

1. A total effective dose equivalent of 0.25 Sv (25 rem) or more.

2. A total effective dose equivalent exceeding 0.05 Sv (5 rem) in a period of 24 hours.

3. An eye dose equivalent of 0.75 Sv (75 rem) or more.

4. An eye dose equivalent exceeding 0.15 Sv (15 rem) in a period of 24 hours.

5. A shallow-dose equivalent to the skin or extremities of 2.5 Gy (250 rads) or more.

6. A shallow-dose equivalent to the skin or extremities exceeding 0.5 Sv (50 rem) in a period of 24 hours.

7. A dose in excess of the occupational dose rate for adults in 20.1201.

8. A dose in excess of the occupational dose limits for a minor in 20.1207.

9. A dose in excess of the limits for an embryo/fetus of a declared pregnant woman in 20.1208.

10. A dose in excess of the limits for an individual member of the public in 20.1301

11. A dose in excess of any applicable limit in the license.

Release of Licensed Material or Contamination (RLM)

The RLM event category includes two types of events. The first type is a radioactive release to air or water exceeding the old 10 CFR Part 20 appendix governing maximum permissible concentrations (MPCs) or the new 10 CFR Part 20 appendix containing annual limit on intakes (ALIs). The second type of RLM event involves contamination events such as a radioactive spill outside of work areas, removable contamination found on equipment, or material tracked around a laboratory such that additional radiological control measures had to be implemented. This category does not include spills inside of laboratory hoods, radiopharmaceutical dose preparation areas, or hot cells where radioactive work routinely requires cleanup or changing of absorbent paper after the performance of a task. Should there be multiple release types (e.g., surface, or air, or water) or areas of contamination associated with the release, this information is classified individually into the NMED Event Table. RLM events are categorized as follows:

1. An unplanned contamination event that requires access to the contaminated area, by workers or the public, to be restricted for more than 24 hours by imposing additional radiological controls or by prohibiting entry into the area.

2. An unplanned contamination event that involves a quantity of material greater than five times the lowest ALI specified in Appendix B of 10 CFR 20.

3. An unplanned contamination event that has access to the area restricted for a reason other than to allow isotopes with a half-life of less than 24 hours to decay prior to decontamination.

4. The release of radioactive material, inside or outside of a restricted area, such that had an individual been present for 24 hours, the individual could have received an intake five times the ALI (the provisions of this paragraph do not apply to locations where personnel are not normally stationed during routine operations, such as hot-cells or process enclosures).

5. The release of radioactive material, inside or outside of a restricted area, such that had an individual been present for 24 hours, the individual could have received an intake in excess of one ALI (the provisions of this paragraph do not apply to locations where personnel are not normally stationed during routine operations, such as hot-cells or process enclosures).

6. Levels of radiation or concentrations of radioactive material in a restricted area in excess of any applicable limit in the license.

7. Levels of radiation or concentrations of radioactive material in an unrestricted area in excess of 10 times any applicable limit set forth in 10 CFR 20 or in the license (whether or not involving exposures of any individual in excess of the limits in 10 CFR 20.1301).

8. For licensees subject to the provisions of the Environmental Protection Agency's (EPA's) generally applicable environmental radiation standards in 40 CFR 190, levels of radiation or releases of radioactive material in excess of those standards, or of license conditions related to those standards.

9. An event that requires unplanned medical treatment at a medical facility of an individual with spreadable radioactive contamination on the individual's clothing or body.

10. An unplanned fire or explosion damaging any licensed material or any device, container, or equipment containing licensed material when the quantity of material involved is greater than five times the lowest ALI specified in Appendix B of 10 CFR 20.

Loss of Control (LAS)

The LAS event category includes those events where licensed radioactive material is lost or found, abandoned or discovered, and stolen or recovered. The radioactive material involved can be sealed or unsealed material, specifically or generally licensed, exempt or non-exempt quantities, involve a licensee or a non-licensee, and can be found anywhere. Abandoned well logging sources are included in this category. LAS events are categorized as follows:

1. Any lost, stolen, or missing licensed material in an aggregate quantity greater than or equal to 1,000 times the quantity specified in Appendix C to 10 CFR 20 under such circumstances that it appears to the licensee that an exposure could result to persons in unrestricted areas.

2. Any lost, stolen, or missing licensed material in a quantity greater than 10 times the quantity specified in Appendix C to 10 CFR 20.

3. An irretrievable well logging source.

4. An attempt made, or believed to have been made, to commit a theft or unlawful diversion of more than 10 Ci of H-3 at any one time or more than 100 Ci in any one calendar year.

5. An attempt made, or believed to have been made, to commit a theft or unlawful diversion of more than 15 pounds of source material at any one time or more than 150 pounds of source material in any one calendar year.

6. An attempt made, or believed to have been made, to commit a theft or unlawful diversion of special nuclear material.

7. Any loss (other than normal operating loss), theft, or unlawful diversion of special nuclear material.

Leaking Sealed Sources (LKS)

The LKS event category includes events involving leaking sealed sources. The NRC requires that most sealed sources be periodically leak tested to verify that the material is still sealed and that the source is still considered safe to use without protective clothing such as gloves. A source is considered leaking if a leak test can detect greater than 0.005 µCi of removable radioactive material. The leaking source is then

removed from service, disposed of or returned to the manufacturer for repair, and a report is sent to the NRC or Agreement State with the details of the leaking source. For regulatory reporting purposes, a leaking source is generally considered a failed device under 10 CFR 30. Some specific reporting criteria are also listed in 10 CFR 31 (generally licensed material), 10 CFR 34 (radiography), and 10 CFR 35 (medical use of byproduct material).

Equipment Problems (EQP)

The EQP event category includes all types of radiological equipment problems, including generally licensed device problems covered in 10 CFR 31; radiography equipment problems covered in 10 CFR 34; irradiator problems covered in 10 CFR 36; well logging problems covered in 10 CFR 39, and other types of equipment covered in 10 CFR 30, 40, 70, and 76. EQP events are defined as the failure of, or a defect in, any piece of equipment that either contains licensed radioactive materials as an integral part, or whose function is to interact with such materials.

Examples of these problems include such things as a radiography source disconnect, a moisture density gauge being run over by a bulldozer, an irradiator source rack drive cable breaking, a well logging source being ruptured during a source recovery attempt, a fan motor failure in an exhaust hood used to store radioiodine, failure of a glove box connector gasket, or a damaged Type B shipping container. The radioactive material or source need not be damaged or leaking for the event to be considered an EQP event. Damage to a device housing, shutter, operation controls, or even a version of a software containing an error are covered in this category.

1. A defect or non-compliance involving the construction or operation of a facility or an activity that is subject to the licensing requirements under 10 CFR Parts 30, 40, 50, 60, 61, 70, 71, or 72.

2. A defect or non-compliance involving a basic component that is supplied for a facility or an activity that is subject to the licensing requirements under 10 CFR Parts 30, 40, 50, 60, 61, 70, 71, 72 or 76.

3. A piece of equipment that is disabled or fails to function as designed when the equipment is required by regulation or license condition to prevent releases exceeding regulatory limits, to prevent exposures to radiation and radioactive materials exceeding regulatory limits, or to mitigate the consequences of an accident.

4. A piece of equipment that is disabled or fails to function as designed when the equipment is required to be available and operable.

5. A piece of equipment that is disabled or fails to function as designed when no redundant equipment is available and operable to perform the required safety function.

6. An unplanned fire or explosion damaging any licensed material or any device, container, or equipment containing licensed material when the damage affects the integrity of the licensed material or its container.

7. The actual or possible failure of, or damage to, the shielding of radioactive material or the on-off mechanism or indicator on a generally licensed device.

8. An unintentional disconnection of a radiography source assembly from the control cable.

9. The inability to retract a radiography source assembly to its fully shielded position and secure it in this

position.

10. The failure of any radiography component (critical to safe operation of the device) to properly perform its intended function.

11. An irradiator source stuck in an unshielded position.

12. Damage to an irradiator's source racks.

13. Failure of the cable or drive mechanism used to move an irradiator's source racks.

14. Inoperability of an irradiator's access control system.

15. Structural damage to an irradiator's pool liner or walls.

16. Abnormal water loss or leakage from an irradiator's source storage pool.

17. Irradiator pool water conductivity exceeding 100 microsiemens per centimeter.

18. A licensee knows, or has reason to believe, that a well logging sealed source has been ruptured.

Transportation (TRS)

The TRS category includes a variety of transportation related events as follows:

1. The presence of removable surface contamination that exceeds the limits of Section 71.87(I).

2. The presence of external radiation levels that exceed the limits of Section 71.47.

3. Any significant reduction in the effectiveness of any approved Type B or fissile packaging during use.

4. Any defects with safety significance in Type B or fissile packaging after first use with the means employed to repair the defects and prevent their recurrence.

5. The conditions of approval in the certificate of compliance were not observed in making a shipment.

6. An accident involving a vehicle carrying licensed material regardless of whether the licensed material is damaged or spilled as a result of the accident.

7. Fire, breakage, spillage, or suspected contamination involving shipment of radioactive material.

Other (OTH)

The OTH event category includes a broad range of reportable events that do not specifically fit into one of the previous categories. This event type may also include events not reportable to the NRC but are included in the NMED program for informational purposes.